The Dynamics of Tax System and Macroeconomic Performance in Nigeria

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Abstract

This study examined the effects of the dynamics of tax system on macroeconomic performance in Nigeria covering the period between 1980 and 2019. The study employed autoregressive distributive lag (ARDL) model as the estimation technique which enabled the determination of the short run (SL) and long run (LR) relationship between tax revenue and macroeconomic performance. Five models were specified; in model 1, the short-run result shows that the Customs and Excise Duties (CED) has negative and significant impact on Gross Domestic Product (GDP), indicating that a percent change in CED will reduce (GDP) by 2.4%. In Model II, in the SR and LR, CED has positive and insignificant impact on inflation, suggesting that a percent change in CED will increase rate of inflation by 16.2% in the short run and 6.88% in the long run. In Model III, a percent change in Petroleum Profit Tax (PPT) will reduce public debt by 0.10% and 0.79% in the short run and long run respectively. In Model IV, CED, PPT and Value Added Tax (VAT) exert a negative but significant influence on unemployment. This means that a percent change in the aforementioned control variables will increase the unemployment rate by 0.00%, 29.3% and 0.19% respectively. In Model V, both in the short run and in the long run, the computed dynamics of tax system has a positive and significant influence on macroeconomic performance in Nigeria, that is, a percent change tax system in Nigeria will increase macroeconomic performance by 0.10% and 3.05%. Hence, taxation should be relied upon to address inflation, economic growth, unemployment, public debt challenges and other macroeconomic fundamentals. It should be at the core of a fiscal policy mix for mobilizing domestic resources on a sustainable manner for socioeconomic development of the country.

***Keywords**:* Tax Policy, Macroeconomic Performance, Macroeconomic Indicators

JEL Classifications: E61, F62, H26

Introduction

The political, economic and social development of any country depends on the amount of revenue generated for the provision of infrastructure in that given country. One means of generating the revenue for providing the needed infrastructure is through a well-structured tax system. Tosun and Abizadeh (2005) Outlined five possible mechanisms by which taxes can affect macroeconomic magnitudes and their performance. First, taxes can inhibit investment rate through such taxes as corporate and personal income, capital gain taxes. Second, taxes can slow down growth in labour supply by disposing labour leisure choice in favour of leisure. Third, tax policy has effect on research and development expenditure. Fourth, taxes can lead to a flow of resources to other sectors that may have lower productivity. Finally, high taxes on labour supply can distort the efficient use of human capital with high tax burdens, even though they have high social productivity. Musgrave and Musgrave (2004) stated that economic effects of tax include micro effects on the distribution of income and efficiency of resource-use as well as macro effect on the level of capacity output, employment, prices and growth.

The dynamics of a tax system, speaks to deliberate changes made by the government in the tax policies, tax laws and administration, as well as tax practices, to enhance the revenue base of the nation by bridging the gap between the national development needs and funding of the needs. It is often associated with tax reforms, which are reviews that are made from time to time in the Nigerian Tax System to enhance domestic resource mobilization through taxation. It may also refer to a plethora of automatic changes, upwards or downward induced by interplay of variables within the macroeconomic system.

A common feature of the dynamics of tax system in most emerging economies is that they could be complex, inelastic, inefficient, inequitable and unfair. Therefore, it is imperative to review them from time to time in line with the prevailing economic realities. This is the attraction of creating and promoting a regime of dynamic tax system capable of driving a robust mechanism for effective domestic mobilization aimed at enhancing positive macroeconomic performance. The dynamic of a tax system also speaks to changes in a tax system that can either be impelled from within the system, or imposed from outside of the fiscal structure through legislation or public policies, that is, changes in the tax system could be endogenous or exogenous.

Romer and Romer (2010), differentiating between endogenous and exogenous tax changes, described endogenous tax changes as those taken to offset factors that push growth away from normal. These include measures designed to

support the economy when it is or is projected to be below potential, such as a personal income tax cut during a recession, or to mitigate the impact of other macroeconomic shocks, like changes in fuel excise duties to mitigate the impact of international oil price volatility on retail fuel prices. We also consider tax changes designed to finance a specific increase in government spending as endogenous, such as an increase in the VAT rate to finance job creation programs.

By contrast, exogenous tax changes are those not taken in response to contemporaneous economic shocks. These fall into two broad categories. The first category includes tax changes that were primarily aimed at increasing long-run growth, such as the income tax reform package announced by the Australian government in September 1985. This category also includes tax reforms motivated by a desire to promote competitiveness, protect tax revenue or generally increase the efficiency of the tax system.

According to the classical economist the only objective of taxation was to raise government revenue. But with the change in circumstances and ideologies, the aim of taxes has also changed. These days apart from the objective of raising the public revenue, tax level affect consumption, production and distribution of economic resources which in-turn affects the social welfare function through the economic development of a country. Taxation can and has been used as an important tool for catalyzing economic performance in the following manner: optimum allocation of available resources, raising government revenue, encouraging savings and investment, acceleration of economic growth, price stability, control mechanism etc.

Despite the importance of tax for current macroeconomic policy-making there is a surprising lack of consensus over the macroeconomic effects of tax changes. Do changes in tax system i.e, tax cuts stimulate the economy? Will tax increases harm economic recovery? Answering these questions remains a contentious issue and one that is particularly pertinent at a time of intense disagreement about the macroeconomic consequences of different fiscal policies.

The lack of consensus in the academic literature partly reflects the difficulty of identifying tax policy changes and shocks uncorrelated with, and uncontaminated by, other fluctuations. The basic problem is one of simultaneity. Changes in taxes are likely to contemporaneously affect GDP and other channels of macroeconomic performance, but commonly used tax variables such as tax revenues are also contemporaneously driven by GDP and allied macroeconomic performance indicators.

The research thrust of this study therefore, is to identify and isolate the dynamics of tax system from among other fiscal policy manifestations and determine its effects on macroeconomic performance, particularly as it relates to GDP, Inflation, Investment (Gross Fixed Capital Formation), unemployment and public debt stock. The broad objective of this study is to examine the effects of the dynamic of tax system on macroeconomic performance in Nigeria. The specific objectives are to examine the short run and long run impacts of tax system on macroeconomic performance in Nigeria and determine the causal link between the dynamics of tax system and macroeconomic performance in Nigeria.

The urgency of modernizing Nigeria's tax systems to make it more dynamic is premised on the realization that the country is rated one of the lowest Tax/GDP ratios in the world. This much was loudly echoed by Nigeria's former Minister of Finance, Kemi Adeosun, at the 2017 Spring Meetings of the IMF-World Bank in Washington DC, USA. The ex-Minister acknowledged that the country must do something fundamental to enthrone a dynamic tax system. The dynamic of tax system offers advantages of three kinds. First, in relation to monolithic or resource-dependent economies, such as Nigeria, dynamic in tax system responds to the country's economic diversification strategy, thus widening the government's revenue base. Second, a dynamic tax regime is fundamental to driving greater competitiveness for businesses through a more efficient capital allocation that results from the diminution or mitigation of fraud, corruption and transactional distortions. Third, dynamic tax system has inherent capacity to impel positive macroeconomic performance. All these are compelling justifications for embarking on this study.

Studies abound on the effect of specific tax- types on economic growth particularly in Nigeria Naomi and Sule (2015). However, none of the existing studies interrogated the impact of changes in tax and taxation on macroeconomic performance. Instances, where tangential attempts were made in some studies to examine the impact of dynamics of tax system on macroeconomic performance; the scope was limited to traditional channels and indicators like GDP. Thus, the appropriateness and timeliness of this study, which main thrust is to interrogate the impact of the dynamics of tax system on macroeconomic performance; employing multiple channels like, investment, inflation, output (GDP), and debt stock, to mention but a few.

The primary focus of this study is on the effects of a dynamic tax system on macroeconomic performance in Nigeria. The study will use both annual and quarterly data on Nigeria covering the time span - 1980 to 2019 to examine the

changes in tax regimes and how they have impacted macroeconomic performance over same period. This period is chosen because of its historical import of sustained democratic governance with its positive implications for economic growth and political stability. It is also the era that the country started experiencing relative decline in her traditional revenue source, in the face of expanding public expenditure needs; triggering a cacophony of calls for re-invention of a more dynamic tax regime, that can respond appropriately to the growing revenue drive of the State.

The paper is organized into five sections. Following this section one, which is the introduction is section two that presents literature review. The theoretical, methodological and empirical literature on the effects of dynamic tax system on macroeconomic indicators is appraised. Section three deals with the theoretical framework and methodology, while section four will be devoted to the presentation, analysis and discussion of results. Finally, section five will summarize the major findings, highlights the lessons for policy and conclusion, with recommendations.

Literature Review

There is a rapidly growing interest on the dynamics of tax system and macroeconomic performance; but not much literature have been generated to support this bourgeoning interest in this thematic aspect of tax study. For clarity and ease of appreciation, the review here is organized into three parts, namely, theoretical and conceptual, empirical and methodological. They are discussed in that order.

Theoretical Review

The dominant theories on the dynamics of tax system and macroeconomic performance can be contextualized within the broader theories of the neoclassical growth theories. These theories include Laffer theory of taxation, and the endogenous growth theories among others. These theories are discussed in turn. Laffer theory of taxation is foundational to this work. The Laffer curve is one of the main theoretical constructs of supply-side economics, and it is often used as a construct to sum up the entire pro-growth world view of supply-side economics. The Laffer curve illustrates the basic idea stating that changes in tax rates have two effects: Effect on tax revenues which is the arithmetic effect and the economic effect (Laffer, 2004). It is a theoretical representation of the relationship between government revenue raised by taxation and all possible rates of taxation. It considered the amount of tax revenue raised at the extreme tax rates of 0% and 100%. The theory concludes that a 100% tax rate raises no revenue in the same way that a 0% tax rate raises no revenue. This is because at 100% rate, there is no longer incentive for

a rational tax payer to earn any income, thus, the revenue raised will be 100% of nothing. It therefore follows that there must exist at least one rate in between where tax revenue would be a maximum.

Endogenous growth theory embraces a diverse body of theoretical and empirical work that emerged in the 1980s (Romer, 1994). Mahir and Azra (2017), state that this theory made fiscal policy a crucial field of study of economic growth by incorporating tax and expenditure as long-run determinate of growth. The model classified tax into distortionary and non-distortionary tax. Distortionary tax are taxes that dissuade investment which consequently reduce economic growth while, non-distortionary tax does not discourage investment and therefore has no adverse effect on economic growth

Conceptual Framework

Conceptually, the dynamic of a tax system could impact macroeconomic performance working through a transmission mechanism that transmits vide some policy elements of a tax system. For example, in Nigeria, the dynamics in her tax system and its macroeconomic effects was rather dispensational and dependent on the dominant fiscal policy tendencies, especially the tax elements. As clearly illustrated in the conceptual framework in figure 2.1, the dynamics in system (1980 - 2019) can conceptually be classified into four separate decades of varied policy tendencies. Each decade characterized by dominance of usage of varied tax measures deployed towards achieving a predetermined macroeconomic performance.

From figure 1, the dynamics of the system could be triggered exogenously - through legislation, executive policy pronouncements, or endogenously through the interplay of variables within the economic system. Either way, it transmits through tax incentives, changes in tax base, tax structure, tax rates, tax laws etc; to affect macroeconomic variables - real GDP, inflation, investment, Public debt stock and unemployment rate, positively or negatively to determine overall macroeconomic performance.

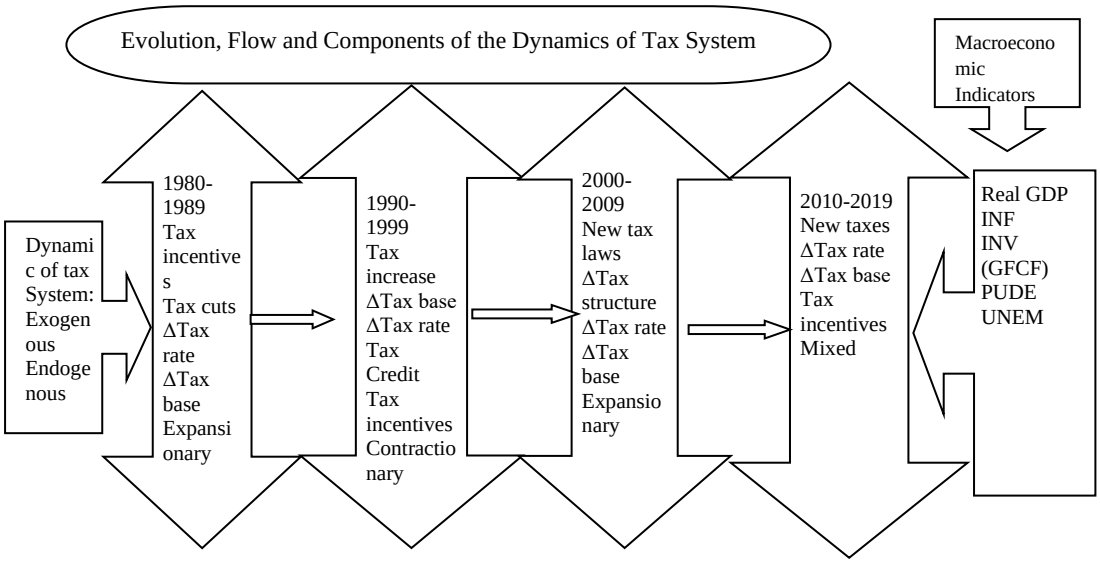

Figure 1: Model framework for determination of pass through of dynamics of tax system to macroeconomic variables
Source: Adapted from Omojolaibi (2012)

Empirical review

Several findings are discernible from the various empirical investigations on the effects of taxes, Taxation and tax system on macroeconomic performance. Some authors found that relationship between tax system dynamics and macroeconomic performance is important in determining the growth and development trajectory of the economy. Few studies found that the relationship is not very germane to economic growth and development. However, other studies are imprecise in their findings. The results of these authors are discussed presently.

Ogbonna and Ebimobowei (2012) examined the impact of tax reforms and economic growth of Nigeria using relevant descriptive statistics and econometric analysis. Their finding revealed that a tax reform is positively and significantly related to economic growth. The study also revealed that tax reforms improve on the revenue generating machinery of government to undertake socially desirable expenditures that will transform to economic growth in real output and per capita basis. In line with their study, if tax policies are stringent, it makes tax revenue to decline; therefore, there is need for constant reforms in the system.

Mountford, and Uhlig (2009) also contributed to the empirical literature by highlighting the asymmetric effects of tax changes, tax-cut and tax-increase, which is important to analyze the dynamic macroeconomic effects of tax

policy shocks across states. They estimated state-dependent model by distinguishing between Romer & Romer (RR) exogenous tax-cut and RR exogenous tax-increase. They find that the impact of tax changes do not depend only on the state of the economy, but also depend on whether the tax changes are tax-cut or tax-increase. It was shown those tax cuts taken to stimulate long-run growth are more likely to increase growth and reduce deficits in good times than bad times, but instead, those tax increases taken to deal with an inherited budget deficit are more successful in terms of output gains and deficit reduction, in bad times than good times.

Cloyne (2013) examined how tax changes affect the components of GDP, such as consumption and investment and also two main components of investment, residential and nonresidential fixed investment to ascertain whether tax changes are tax cuts or tax increases and evaluate the possibility that the main macroeconomic aggregates react asymmetrically to the sign of the tax changes. Based on the baseline estimation he found that the effects of exogenous tax increases on output are different depending on the state of the economy. To that end, they examined the response of the various components of GDP, such as consumption and investment, to exogenous tax shocks and transmission mechanism of tax changes by highlighting the behavior of nonresidential and residential fixed investment to tax changes.

Chigbu and Njoku (2015) investigated the impact of taxation on Nigerian economy covering period from 1994 to 2012. The results of their statistical analysis reveal that positive relationships exist between Custom and Excise Duties, Company Income Tax, Personal Income Tax, Petroleum profit tax and Value Added Tax) and (Gross Domestic Product, Unemployment). According to them, the explanatory variables have not significantly contributed to the growth of Nigeria economy; also, the explanatory variables have not significantly contributed to the reduction of the high rate of unemployment and inflation rate in Nigeria for the period studied.

In general, most methodological works on tax and macroeconomic performance are largely quantitative. OLS/2SLS and co-integration methods, vector error correction model (VECM), Auto-regressive Distribution Lag (ARDL) granger causality test, vector auto-regressive (VAR) techniques and panel data techniques, generalized method of moment (GMM) estimation techniques featured prominently. Ogbonna and Ebimobowei, (2012) adopted the Ordinary Least Squares (OLS) to their study of the macroeconomic effect of PIT and CIT on economic development; the result, depicts positive and significant relationship between PPT, CIT, respectively and economic stability. One significant observation about the results is the conformity to the economic

theoretical expectation that as more revenues are generated from reforms in petroleum profit tax, company income tax, and value added tax, the federally generated revenues substantially increase which, in turn, enhance economic growth and stability.

Olaoye, Ogundipe and Oluwadare (2018) in their study investigated the impact of taxation on economic development of Nigeria from 2003 to 2017.Vector Error Correction Model (VECM), Augmented Dickey-Fuller (ADF) unit root test, Auto-regressive Distributed Lag (ARDL) bounds test, Jarque-Bera Normality Test and Eigenvalue stability condition were utilized in this study. It was concluded that taxation has a significant long run relationship with Nigeria's economic development.

Theoretical Framework and Research Methodology

The methodology of this research will include theoretical framework, model specification, sources of data, and the techniques used in the analysis of data. The theoretical foundation of this study is based on endogenous growth theory adopted and expanded by Romer (1994). The theory was further adopted by Olawunmi, and Ayinla, (2007) who argue that government revenue when properly collected and utilize can stimulate growth and enhance the macroeconomic performance in the country. They employed endogenous growth theory in analyzing the study, by incorporating all the indicators of tax system as significant factor in the model. The simple endogenous growth AK model of the aggregate production in a closed economy is specified as:

$$Y_t = AK_t^{\alpha} L_t^{\beta} \tag{1}$$

Where output (Yt) is a function of the aggregate capital stock (Kt), which is presumed to be a composite of physical and human capital, as explained in Lucas (1988), where the two types of capital are reproducible with identical technologies. The above equation can be linearized as:

$$LnY_t = \alpha_0 + \alpha_1 LnK_t + \beta_1 LnL_t + \mu_t \tag{2}$$

Model Specification

Model specification involves the expression of a relationship into precise mathematical forms. The model for this study for dynamics of tax system and macroeconomic performance is specified as in four models below:

$$\begin{aligned} LGDP_t = {} & \alpha_0 + \beta_{11} LCED_t + \beta_{12} LPPT_t + \beta_{13} LCIT_t \\ & + \beta_{14} VAT_t + \beta_{15} NOEX_t + \beta_{16} POGR_t + \beta_{17} EXCH_t + \varepsilon_t \end{aligned} \tag{3}$$

$$\begin{aligned} INF_t = {} & \alpha_0 + \beta_{21} LCED_t + \beta_{22} LPPT_t + \beta_{23} LCIT_t \\ & + \beta_{24} VAT_t + \beta_{25} NOEX_t + \beta_{26} POGR_t + \beta_{27} EXCH_t + \varepsilon_t \end{aligned} \tag{4}$$

$$LPUDE_t = \alpha_0 + \beta_{31}LCED_t + \beta_{32}LPPT_t + \beta_{33}LCIT_t + \beta_{34}VAT_t + \beta_{35}NOEX_t + \beta_{36}POGR_t + \beta_{37}EXCH_t + \varepsilon_t \quad (5)$$

$$UNEM_t = \alpha_0 + \beta_{41}LCED_t + \beta_{42}LPPT_t + \beta_{43}LCIT_t + \beta_{44}VAT_t + \beta_{45}NOEX_t + \beta_{46}POGR_t + \beta_{47}EXCH_t + \varepsilon_t \quad (6)$$

In order to determine the actual effect of the dynamics of tax system on macroeconomic performance, the study computed an index using the principal component analysis (PCA). The computed index is specified as:

$$MPI_t = \alpha_0 + \beta_1 DTSI_t + \beta_2 NOEX_t + \beta_3 POGR_t + \beta_4 EXCH_t + \varepsilon_t \quad (7)$$

LGDP is the log gross domestic product, INF, LPUDE, and UNEM represent inflation, public debt and unemployment respectively. LCED, represents the log of custom and excise duties, LCIT signifies the log of company income tax while LVAT is the log of value added tax, NOEX represents non-oil export, POGR is population growth rate, EXCH signifies official exchange rate. MPI is macroeconomic performance index and DTSI represents dynamics of tax system index. α_0, is the constant term, $\beta_1, \beta_2, \beta_3, \beta_4 \ldots\ldots\ldots \beta_{47}$ are the parameter estimates, while ε_t is the stochastic error term.

Estimation Techniques and Procedure

This study employed auto-regressive distributive lag (ARDL) model as the estimating technique since it is most suitable for the work. This is because it enables us to determine the short and long-run relationship between tax revenue and economic growth in Nigeria. In addition, the rationale for employing ARDL model is because it permit variables that is stationary at level I(0) and at first difference I(1), also, it shows the short and long-run relationship among variables estimated. The equation (7) is rearranged in estimable form in ARDL bound testing framework as:

$$\Delta MPI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta MPI_{t-1} + \sum_{i=0}^{p} \alpha_2 \Delta DTSI_{t-1} + \sum_{i=0}^{p} \alpha_3 \Delta NOEX_{t-1} + \sum_{i=0}^{p} \alpha_4 \Delta POGR_{t-1} + \sum_{i=0}^{p} \alpha_5 \Delta EXCH_{t-1} + \beta_1 \ln MPI_{t-1} + \beta_2 \ln DTSI_{t-1} + \beta_3 \ln NOEX_{t-1} + \beta_4 \ln POGR_{t-1} + \beta_5 \ln EXCH_{t-1} + \varepsilon_t \quad (8)$$

Presentation and Analysis of Results

Descriptive Statistics of the Variables

This shows the statistical inference in the study which includes the average mean, median, skewness and Kurtosis which are estimated in the model. Below is the table indicating the analysis.

Table 1: Descriptive Statistics of the Variables

	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob	Obs
LGDP	14.50310	15.15723	3.501684	-2.058463	9.677332	102.6	0.00	40
INF	18.99850	12.71500	16.86920	1.823676	5.159538	29.94	0.00	40
LPUDE	7.289662	7.909676	2.076944	-0.690557	2.490075	3.61	0.16	40
UNEM	11.68250	10.40000	8.421185	0.821924	2.742037	4.61	0.01	40
LCED	11.09975	11.78745	2.200712	-0.306481	1.878803	2.72	0.26	40
LCIT	4.363758	4.364823	2.035927	-0.029139	1.546245	3.53	0.17	40
VAT	438.5331	74.85000	719.0759	1.947799	5.807826	38.4	0.00	40
LPPT	6.552477	5.613034	3.427039	1.019185	2.748085	7.03	0.03	40
NOEX	1118.498	407.6500	1449.173	1.137609	2.962015	8.63	0.01	40
POGR	2.615750	2.620000	0.068608	0.081911	1.790633	2.48	0.29	40
EXCH	102.6249	106.4650	105.2251	1.022644	3.379434	7.21	0.03	40

Source: Author`s computation (2021)

The average mean for log of gross domestic product (LGDP) stood at 14.50% as against the median value of 15.15, this implies that gross domestic product as one the indicators of macroeconomic performance grow at an average of 14.5% annually. In the same vein, the average mean of inflation rate stands at 18.99%, higher than the median value. This suggests that inflation as one of the measures of macroeconomic performance in Nigeria grows at an average rate of 18.9% annually. The increase in the rate of inflation in the economy could impact negatively on the gross domestic product via increase in the cost of raw materials. Similarly, the average mean for log of public debt stood at 7.28% lower that the median value of 7.90. This implies that public debt on average grows at 7.28% annually. The rate of unemployment on average basis is 11.68% compare to its median value of 10.40. The implication is that as rate of inflation increase gross domestic product declines thus causing unemployment and national debt to increase.

Pre-Test Analysis on Stationarity

This section presents the Augmented Dickey Fuller (ADF) unit root test which is conducted on the variables as the first step to diagnose the stationarity status of the variables in order to determine the appropriate test and estimation technique to employ for study.

Table 2: Stationarity Test

	Level				First Difference			
Variable	**ADF Static**	**1%**	**5%**	**Level of Int.**	**ADF Static**	**1%**	**5%**	**Level of Int.**
LGDP	-1.3806	-3.6055	-2.9369	I(0)	-7.4395***	-3.6104	-2.9389	I(1)
INF	-3.045**	-3.6055	-2.9369	I(0)	-5.9153***	-3.6104	-2.9389	I(1)
LPUDE	-2.5721	-3.6055	-2.9369	I(0)	-4.3840***	-3.6104	-2.9389	I(1)
UNEM	-0.5282	-3.6055	-2.9369	I(0)	-5.0374***	-3.6104	-2.9389	I(1)
LCED	-0.8325	-3.6055	-2.9369	I(0)	-5.0627***	-3.6210	-2.9434	I(1)
LCIT	-0.8258	-3.6463	-2.9540	I(0)	-8.7744***	-3.6104	-2.9389	I(1)
LPPT	-0.0814	-3.6104	-2.9540	I(0)	-6.6223***	-3.6155	-2.9411	I(1)
VAT	-5.514**	-3.6537	-2.9571	I(0)	-6.470***	-3.6701	-2.9639	I(1)
NOEX	-2.7898	-3.6055	-2.9369	I(0)	-4.3679***	-3.6104	-2.9389	I(1)
POGR	-2.8208	-3.6104	-2.9389	I(0)	-4.3880***	-3.6104	-2.9389	I(1)
EXCH	-2.6944	-3.6055	-2.9369	I(0)	-4.5654***	-3.6104	-2.9389	I(1)

*Note: *** significant at 1%, ** significant at 5%, Mackinnon critical values and are shown in parenthesis. The lagged numbers shown in brackets are selected using the minimum Schwarz and Akaike Information criteria*

The Augmented Dickey Fuller (ADF) test result confirm that the log of gross domestic product (LGDP), log of public debt (LPUDE), unemployment (UNEM), log of custom and excise duties (LCED), the log of company's income tax (LCIT), log of petroleum profit tax (LPPT), non-oil export (NOEX), population growth rate (POGR) and exchange rate are stationary are not stationary at level for 1% and 5% level of significance, although inflation rate (INF) and value added tax (VAT) are stationary at level for 5% level of significance, meaning that there is a unit root.

ARDL Bound Test Result

The Auto-regressive Distributive Lag (ARDL) bound testing model is the most appropriate for this study. This is because it focuses on the short-run and long-run relationship between the dynamics of tax system and macroeconomic performance in Nigeria, by specifying all the variables that are likely to affect the macroeconomic performance in the country.

Table 3: Bounds co-integration Result

Test Statistic	Value	K
F-statistic: Model 1	9.7040	7
Model II	1.3249	7
Model III	5.2665	7
Model IV	7.3113	7
	Critical Value Bounds	
Significance	I(0) Bound	I(1) Bound
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84
1%	2.96	4.26

Source: Author`s computation (2021)

The result of bound co-integration test reveal that long-run equilibrium relationship exist between dynamics of tax system and macroeconomic performance in Nigeria, since the F-statistic for the three models is greater than I (0) and I (1) bound. In this case the study can proceed to estimate the short run and long run relationship by employing the auto-regressive distributive lag.

Table 4: Autoregressive Distributive Lagged (ARDL) Estimation
Dependent Variable: Macroeconomic performance
Model I (LGDP), Model II (INF), Model III (LPUDE), Model (UNEM), Model (MPI)

	Variable	Model I	Model II	Model III	Model IV	Model V
	D(LCED)	-2.4612**	16.2073	0.3783***	-2.9141**	-
	D(LCIT)	0.2304	1.0193	0.0512	1.4784**	-
	D(LPPT)	1.0398***	-5.2456	-0.1090***	-1.835***	-
Short-run	D(VAT)	-0.0050***	0.0164	0.0002	-0.0051**	-
Estimation	D(NOEX)	0.0092***	-0.0046	0.0001	0.0045	0.0009**
	D(POGR)	-29.6748	102.86	1.8767	29.3099	-0.1562
	D(EXCH)	-0.0009	0.0002	0.0105***	0.1971***	0.0114
	CointEq(-1)	-2.5470**	-0.515***	-0.1376**	-0.888***	-0.2854
	DTSI	-	-	-	-	0.1079***
	LCED	1.2053***	6.8881	0.8461**	-1.0517	-
	LCIT	0.0904	-14.878	-0.2913	1.9868	-
	LPPT	0.5114**	-0.0236	-0.7918**	-4.0634	-
Long-run	VAT	-0.0014***	0.0319	0.0017	-0.0058	-
Estimation	NOEX	-0.0001	-0.0090	0.0004	0.0040	-0.0024**
	POGR	-1.9931	143.36	13.632	28.048	-0.5473
	EXCH	-0.0189**	0.0005	-0.0033	0.1180	-0.0263
	C	5.1971	-379.66	-32.400	-48.794	5.9583
	DTSI	-	-	-	-	3.0596**

*Note: *** significant at 1%, ** significant at 5%*
Source: Author`s computation (2021)

From Model I, the short-run result shows that the log of custom and excise duties has negative and significant impact on the log of gross domestic product,

indicating that a percent change in custom and excise duties will reduce gross domestic product by 2.4%. Similarly, the log of company's income tax in the short run and in the long run has a positive but insignificant effect on the log of gross domestic product, indicating that a percent change in company income tax will enhance gross domestic product by 0.23% and 0.09%, implying that government tax on companies has the capacity to increase gross domestic product and further impact positively on economic performance in Nigeria. The co-integration equation which signifies the error correction model is negative and significant, implying that speed of adjustment from the short disequilibrium to the long run equilibrium.

Result from model II, shows that in the short run and in the long run, log of custom and excise duties has positive and insignificant impact on the inflation, suggesting that a percent change in custom and excise duties will increase rate of inflation by 16.2% and 6.88%. The result further confirms that an increase in custom and excise taxes will enhance the rate of inflation in the country and further lead to increase in the cost of production and cost per unit of output.

Result from model III, shows that in the short run and in the long run, log of custom and excise duties has positive and significant impact on the log of public debt, meaning that increase in custom and excise duties could lead increased public debt if government fail to manage the revenue efficiently. In the same vein, the log of company's income tax in the short run has positive but insignificant influence on log of public debt, indicating that a percent change in company income tax will enhance inflation rate by 0.05%.

The short run result from model IV, confirmed that log of custom and excise duties, log petroleum profit tax and value added tax has a negative but significant influence on unemployment, meaning that decrease custom and excise duties, petroleum profit tax and value added tax will reduce the rate unemployment and create full employment in the country, while the log of company income tax has a positive but insignificant influence on unemployment, implying that a percent change in company income tax will increase the rate of unemployment by 1.47%.

The Model V shows the result of the computed dynamic tax system and macroeconomic performance in Nigeria. In order get the exact effect of tax system on macroeconomic performance, the study computed dynamic tax system and macroeconomic performance index using the principal component analysis (PCA). The result of the computed index shows that dynamics of tax system in Nigeria for the period estimate has a positive and significant influence on macroeconomic performance in Nigeria, both in the short run and

in the long run. This means that a percent change in the dynamics of tax system in Nigeria will increase the macroeconomic performance by 0.10% and 3.05%.

Table 5: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
DTSI does not Granger Cause MPI		0.73961	0.0150
MPI does not Granger Cause DTSI	39	1.70771	0.0269
EXCH does not Granger Cause MPI		0.10499	0.0006
MPI does not Granger Cause EXCH	39	0.31875	0.0292
NOEX does not Granger Cause MPI		0.52797	0.5946
MPI does not Granger Cause NOEX	39	2.24773	0.1211
EXCH does not Granger Cause DTSI		0.30648	0.0381
DTSI does not Granger Cause EXCH	39	6.36483	0.0046
NOEX does not Granger Cause DTSI		0.91104	0.4120
DTSI does not Granger Cause NOEX	39	3.25988	0.0511
NOEX does not Granger Cause EXCH		6.96665	0.0029
EXCH does not Granger Cause NOEX	39	4.07885	0.0258

Source: Author`s computation (2021)

The granger causality test in Table 5 revealed that there is bidirectional causality running from dynamics of tax system to macroeconomic performance, meaning that improved tax system and regime will produce a better macroeconomic policy that can enhance the economic performance of the country. Also, the result further affirmed that bidirectional causality runs between exchange rate and macroeconomic performance as well as exchange and dynamics of tax system and that non-oil export and exchange rate.

Post Estimation Results: Heteroskedasticity, Serial correlation & Ramsey Reset Tests

For the robustness of the result, further diagnostic and stability test were employed. The diagnostic and stability test tabled below and further explained.

Table 6: Heteroskedasticity Test: Breusch-Pagan-Godfrey Tests

F-statistic	0.767699	Prob. F(10,27)	0.6577
Obs*R-squared	8.412657	Prob. Chi-Square(10)	0.5886
Scaled explained SS	3.953802	Prob. Chi-Square(10)	0.9494

Source: Author`s computation (2021)

The corresponding p-values for F-statistics and chi-square are 0.6577 and 0.5886 respectively, which are > 0.05, on the basis of which we cannot reject the null hypothesis rather we accept it against the alternative one and conclude that the residual is homoscedastic. Furthermore, since probability (F-Statistic) and probability (Chi-square) are both 0 then the null hypothesis should

therefore not be rejected meaning that there is no existence of heteroscedasticity.

The Breusch – Godfrey Correlation Lagrange Multiplier test exhibits probability values of 0.3984 and 0.5401 for F-statistics and observed R-Squared that are significant to accept the null hypothesis that there is no autocorrelation in the residual. By this we understand that the test is valid because there is presence of serial correlation in the series estimated.

Discussion of Results

The Augmented Dickey Fuller stationarity test confirm that only inflation rate and value added tax are stationary at level for 1%and 5% level of significance while other variables are not. After first differencing all the variables became stationarity at 1% level of significance, implying that they are mean reverting and convergence towards long run equilibrium. In the same vein, the bound co-integration test affirmed that there is long run equilibrium relationship among variables in the model.

Other empirical results confirmed that in Model I, the log of custom and excise duties has a negative but significant influence on gross domestic product, although in the long run, it asserts a positive and significant effect on gross domestic product. This means that custom and excise duties reduce GDP in the short run but enhances it in the long run. These results are in line with that of Worlu and Nkoro (2012); Umoru and Anyiwe (2013). Similarly, in Model II, in the short run, all the tax indicators have a positive but insignificant influence on inflation with the exception of petroleum profit tax that has a negative and insignificant effect on inflation. This result confirms with that of Pitchford and Turnovshy (1976).

In Model III, log of custom and excise duties in the short and long run has positive effect on public debt, while petroleum profit tax assert a negative but insignificant influence on public debt. However, company income tax in the short run has positive but insignificant influence on public debt, although in the long run it a negative and insignificant influence on public. In the same manner, value added tax has a positive but insignificant influence on public debt. This result is in line with that Morina, & Misiri, (2019). Similarly, in Model IV, in the short run all the indicators of tax system has significant influence on unemployment, although custom and excise duties, petroleum profit tax and value added tax has negative influence while company income tax assert a positive influence. In Model V, both in the short run and in the long run, the computed dynamics of tax system has a positive and significant influence on macroeconomic performance in Nigeria. This study is in line with

that of Arachi, Bucci and Casarico, (2015) and Atsu, Offiong and James (2017).

Summary, Conclusion and Policy Implications

The first objective of this study sought to examine the short run and long run of dynamics of tax system on macroeconomic performance in Nigeria from 1980 to 2019. In order to determine the actual effect of the dynamics of tax system on macroeconomic performance, the study computed an index using the principal component analysis (PCA); by which the index of macroeconomic and policy aggregates like real GDP, inflation rate, investment, money supply, and exchange rate in Nigeria from 1980 to 2019.

Stationarity and cointegration tests were performed on the variables and the result of bound co-integration test reveal that long-run equilibrium relationship exist between dynamics of tax system and macroeconomic performance in Nigeria, since the F-statistic for the three models is greater than I (0) and I (1) bound. Tests statistics showed that the data set were normally distributed and the model was internally consistent and can be relied upon for policy formulation. The log of company's income tax in the short run has positive but insignificant influence on log of public debt, indicating that a percent change in company income tax will enhance inflation rate by 0.05%. However, in the long run, the log of company's income tax asserts a negative and insignificant effect on log of public debt, implying that government tax on companies has the capacity to decrease government borrowing thus leading to decline in debt in the country. Also, the log of petroleum profit tax in the short and long run has negative and significant influence on log of public debt.

The result of the computed index shows that dynamics of tax system in Nigeria for the period estimate has a positive and significant influence on macroeconomic performance in Nigeria, both in the short run and in the long run. This means that a percent change in the dynamics of tax system in Nigeria will increase the macroeconomic performance by 0.10% and 3.05%

The short-run and long run ARDL test also revealed that taxation matters in macroeconomic outcomes in Nigeria. This goes to show that Nigeria government can harness more tax revenue or resources by increasing their tax revenue through expansion of their tax base, moderating tax incentives, enhance tax rate where such is compatible with efficiency and equity, while not a disincentive to investment and productivity.

Importantly, the findings that the lagged value of taxation exhibits an inverse relationship with some macroeconomic variables key to economic growth and development suggests that proactive policy steps need to be taken. For

instance, there is need for government to strengthen the tax administrative machinery; close loopholes for tax evasion and official corruptions, thus ensuring improved tax revenue and effective utilization of tax revenue proceeds respectively. Creation of employment will also guarantee increased tax base which will also improve tax revenue mobilization. The much reliance of foreign resources had made the country to experience the debt overhang problem and crowding out effect of external borrowing. Reorientation of the dynamics of the tax system can reverse the adverse trajectory of Nigeria public debt stock and other key macroeconomic magnitudes.

The result reveals an important lesson for policy makers. There is need for a sustained Improvement of the tax system, in terms of building more dynamism into the tax structure that makes components of the tax structure attain their full potentials. That is, contributing to achieving revenue targets and enhancing domestic resource mobilization through tax. From the study the average revenue generated by custom officials as revenue to government is 11.09% which is less than the median value of custom and excise duties in Nigeria. Also, the average mean of log of company's income tax is 4.36% which is equivalent to the median value of company's income tax of 4.36. This means that the average tax generated by government from company's profit is equal to the amount of taxes generated from other sources of direct taxation The fiscal authority should devote more effort and resources to collection and administration of company income tax among other direct form of taxes to enhance domestic resource mobilization.

Similarly, the log of company's income tax in the short run and in the long run has a positive but insignificant effect on the log of gross domestic product, indicating that a percent change in company income tax will enhance gross domestic product by 0.23% and 0.09%, implying that government tax on companies has the capacity to increase gross domestic product and further impact positively on economic performance in Nigeria. Policy and structures to enhance collection and administration of custom and excise duties should be strengthened. Additionally, incentives to deepen the industrial and manufacturing sector, especially the Small and Medium Enterprises must be explored given that they constitute the critical mass taxable base for excise duties.

The population growth rate and official exchange rate show negative influence on growth of output, but non-oil export assert positive influence in the short run and negative effect in the long run-on growth of output. Hence, policies to positively influence growth in population to align with set macroeconomic objective of growth with low unemployment rate should be pursued. Also

exchange rate regime to should be streamlined to obliterate multiple exchange rates, and measures put in place to shore-up the value of the naira against major tradable currencies.

The study suggests that inflation as one of the measures of macroeconomic performance in Nigeria grows at an average rate of 18.9% annually. The increase in the rate of inflation in the economy could impact negatively on the gross domestic product via increase in the cost of raw materials. The implication is that as rate of inflation increase, gross domestic product declines thus causing unemployment and national debt to increase. The fiscal authority working in concert with the monetary authority should put together a policy framework that promotes a tax system that can moderates inflationary pressure (especially supply-induced) without compromising growth.

The implications of the foregoing for policy makers that in inflation-targeting, the following taxes, customs and excise taxes, company income tax, petroleum profit tax for direct taxes, and value added taxes for indirect should be emphasized for tinkering. Ditto for public debt management; to reduce public debt in the country, government will have to increase petroleum profit tax, custom and excise duties and value added tax, so as to generate adequate revenue for the country, to enhance debt/revenue ratio (a measure of debt sustainability) since government will still engage itself in borrowing. It is in the light of the above that we perceive some wisdom in government's fiscal action introducing new tax elements in the 2022 budget and other fiscal plan documents; such as, additional taxing of carbonated drinks, alcoholic, petroleum products and some imported luxury items.

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